REMARKS

Claims 1 – 26 were pending in the present application. Claims 1 – 26 remain pending in the present application.

Claims 1 – 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frey et al. (U.S. Patent Number 6,029,168, hereinafter 'Frey') in view of Mukherjee (U.S. Patent Number 6,466,978, hereinafter 'Mukherjee'). Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Frey in view of Mukherjee, further in view of Banerjee et al., (U.S. Patent No. 6, 795, 830, hereinafter, 'Banerjee'). Applicant respectfully traverses these rejections and requests reconsideration in view of the following remarks.

Rejections Of Independent Claims

Claim 1 recites a method comprising, in pertinent part, associating **a signature** with the data object**, indicative of a state of the data object**; querying the second storage environment **for a change to the signature** in preparation for a data access operation on the data object, and **updating** the first data structure **if the signature has changed.**

In rejecting claim 1, the Examiner asserts that Frey discloses "associating a signature with the data object". Applicants respectfully disagree. The Examiner acknowledges that col. 2, lines 55 – 61, which disclose "unique pointers", do not appear to address the limitation "indicative of the state of the data object", but then proceeds to repeat the citation of col. 2, lines 55 – 61 in the rejection (see page 6 of the Final Action) and adds the citations of lines 17 – 31 of col. 8 to "provide the citation for the argued limitation". The Examiner then cites Frey, col. 8, lines 4 – 17 as teaching "querying the second storage environment for a change to the signature". Applicants respectfully disagree with this assertion as well. Column 2, lines 55 – 61 and col. 8, lines 4 –31 of Frey are reproduced in full below:

> It is another object of this invention to provide system-wide unique pointers for consistent, reliable access to distributed file data blocks. The present invention utilizes a specialized data element which enables indication of the location of another data element in a very diverse and distributed file data environment residing across several computing systems and storage devices. (Frey, col. 2, lines 55 - 61)
>
> In the case where a file access manager 44, on a non-starter node, receives a request to retrieve blocks of a file block which does not exist, the file access manager 44 sends a query to the file access manager of the starter node for the file which the request is made. The query requests that the file access manager of the starter node resolve the conflict as to whether the file has just been created and the user is too early or the file has just been deleted and the user is too late. The file access manager of the starter node can respond to the query by (1) confirming that the file request is valid and so the requesting file access manager should allocate or write space for the file block, or (2) stating that the file block request is invalid as the file never existed or was deleted and so the file access manager should deny the request with an error showing that no such file exists. Thus, each file access manager only keeps file meta-data associate with files and file blocks that are stored on storage that it manages. This localization of file resource information contrasts with the global file manager methods shown in the prior art examples of FIG. 3.
> If desired, parity blocks may be computed based on subsets of the file data blocks. It is to be emphasized that the parity block and its generation is optional and is based on a file parameter and is not limited by the position where any particular file data blocks are to be stored. Additional file parameters may include extended attribute file parameters such as, for example, security access levels or encryption information. (Frey, col. 8, lines 4 – 31)

In contrast to the Examiner's assertion, the additional lines 17 – 31 cited from col. 8 of Frey as shown above also do not teach or suggest a **signature** indicative of a state of the data object, where a second storage environment is queried for a change to the signature in preparation for a data access operation, as recited in claim 1. The "query" sent to the file access manager of the starter node is to "resolve the conflict as to whether the file has just been created and the user is too early or the file has just been deleted and the user is too late", not for a "**change to a signature**". In the Final Action, the Examiner appears to once again indicate, e.g., by underlining the phrase "unique pointers" in the lines from col. 2, that it was the "unique pointers" of Frey that correspond to the signature of claim 1. However, the newly-recited lines from col. 8 of Frey are silent with respect to the "unique pointers", so if the Examiner is maintaining his assertion that the "unique pointers" teach the "signature" of claim 1, the recitation of lines 17 – 31 of Frey does not appear to overcome the incorrectness of the rejection. If the Examiner intended to withdraw his rejection on the basis of the "unique pointers" phrase, the Examiner is respectfully requested to clarify exactly where in Frey signatures with the features recited

in claim 1 are taught (e.g., exactly which of the objects described in Frey have each of the features of the signature recited in claim 1). Neither the "file meta-data", nor the "parity blocks", nor the "file parameters" of col. 8 of Frey possess the combination of features of the signature recited in claim 1. Applicants can find no teaching or suggestion anywhere in either Frey, Mukherjee or Banerjee, taken singly or in combination, of such a signature. Accordingly, claim 1 is believed to patentably distinguish over the art cited by the Examiner, and to be in condition for allowance.

Further with respect to claim 1, the Examiner asserts that Mukherjee discloses "updating the first data structure", and cites Column 10, lines 31 – 38 and lines 57 – 59, and Column 5, lines 35 – 41 of Mukherjee in support. Once again, the Examiner does not appear to address the limitation of "updating the first data structure **if the signature has changed**", as recited in claim 1. The lines of Mukherjee cited by the Examiner are:

> (Col. 10, lines 31 – 38): Referring to FIG. 6C, a client 131 initiates a file operation by locating the file and then sending a request to the associated disk manager 134. At step 156 the client 131 queries the file locator table 144 to determine upon which disk 132 the desired file is located. The client 131 then queries the disk locator table 142 at step 158 to find the disk manager 134 that is associated with the disk 132, step 158, sends a file request to that disk manager 134, step 160.
>
> (Col. 10, lines 51 – 59): The network manager 136 evaluates the request, step 168, and grants the request from the disk manager 134 if there is sufficient network bandwidth, step 170. After the request from the disk manager is granted, the network manager 136 and disk manager 134 update their corresponding bandwidth records to reflect the change to available bandwidth, step 172. The control information in the network manager mirror 140 and disk manager mirror 138 is then updated, step 174. The control information in the network manager mirror 140 and disk manager mirror 138 is then updated, step 174.
>
> (Col. 5, lines 35 – 41): Metadata management is a medium load server task that is required in a serverless file system approach if the clients cache metadata information. When write operations by other clients cause the metadata to be modified, the client that is acting as server either logically remaps the cached metadata or informs the other clients to reload the new metadata.

The "queries" to the file locator table and the disk locator table in lines 31 – 38 are not about changes to a signature. The updating of the "control information" in lines 57 – 59 has nothing to do with a change to a signature, or with a query to determine

whether a signature has changed. The metadata modification, remapping, and reloading of col. 5, lines 35 – 41 of Mukherjee is not related to a signature or to a query about a signature change. There is no teaching or suggestion in the cited lines of Mukherjee, or anywhere else in Frey, Mukherjee or Banerjee, of a query to determine whether a signature with the features recited in claim 1 has changed, and of updating a data structure **if the signature has changed**.

Applicants respectfully submit that the cited art does not teach or suggest the combination of limitations of claim 1, and that the rejection of claim 1 is therefore improper.

As noted in a response to a previous Office Action, Applicants furthermore respectfully disagree with the Examiner's assertion that it would have been obvious to modify the teachings of Frey with the teachings of Mukherjee "in order to maintain system consistency and accuracy especially when subsequent requests are received." Frey specifically teaches that "the present invention provides a distribution of entries, such as fields and indexes or any commands that are used to describe and work with data, **without replication of the entries**" (Col. 2, lines 47 – 50). Accordingly, Frey would appear to teach away from a system that employs disk manager mirrors as disclosed by Mukherjee.

Independent claim 9 recites limitations similar to those of claim 1, and is therefore believed to patentably distinguish over the art cited by the Examiner for at least the reasons cited above.

Independent claim 15 recites a computer readable medium comprising, in pertinent part, "a signature representing a data object residing on a second computer readable medium, wherein the **signature is indicative of a state of the data object**". The computer readable medium also comprises a map including a plurality of nodes: a first node representing the data object, a file system node representing a file system on a second computer readable medium, a volume node representing a volume manager

associated with the file system, one or more partition nodes managed by the volume manager, and one or more disk identifications representing one or more storage devices housing the data object.The map is updated when a change to the signature is detected. Applicants respectfully assert that neither Frey, Mukherjee nor Banerjee, taken singly or in combination, teach or suggest the combination of a signature **indicative of a state of the data object** and a map as recited in claim 15. Claim 15 is therefore also believed to patentably distinguish over the art cited by the Examiner.

Independent claim 21 recites a system comprising, in pertinent part, "**a signature indicative of a state of the one or more data objects, wherein the map is updated when changes are detected and associated with the signature**". Applicants respectfully assert that neither Frey, Mukherjee, nor Banerjee, taken singly or in combination, teach or suggest a signature indicative of a state of one or more data objects, or updating a map when changes are detected and associated with the signature, as recited in claim 21. Claim 21 is therefore also believed to be in condition for allowance.

Rejections Of Dependent Claims

With respect to claim 5, the Examiner asserts that Mukherjee discloses "wherein the generation further includes detecting a mirroring of the data object on at least two storage devices within the second storage environment", and cites col. 9, lines 19 – 45 and col. 16, lines 21 – 34 of Mukherjee in support. Once again, Applicants respectfully disagree. The cited portions of Mukherjee teach "mirrors of the managers" (e.g., "network managers, file managers and cluster managers") and describe the functionality of these mirrored managers, but are silent with respect to "**detecting** a mirroring of a data object" as part of a "**generation of a data structure** from the reference representing one or more physical locations of the data object within the second storage environment, wherein one or more extents of the data object within the second storage environment are provided during the generation", as recited in the parent claims of claim 5. Claim 5 is therefore believed to patentably distinguish over the art cited by the Examiner. The

Examiner is respectfully requested to indicate exactly where Mukherjee, Frey or Banarjee teach a generation of the data structure representing physical locations of a data object, **where the generation includes a detection of a mirroring of the data object and also includes a provision of one or more extents of the data object**, as recited in claim 5, or to withdraw the rejection of claim 5.

Claim 17 (in combination with its parent claim 15) recites a map comprising, in pertinent part, "**a first node** representing the data object, **a file system node** representing a file system on a second computer readable medium, **a volume node** representing a volume manager associated with the file system, and **one or more partition nodes** managed by the volume manager, wherein **each node includes metadata".** In response to Applicants' arguments regarding claim 17, the Examiner asserts that the limitation that "each node includes metadata" is taught by Mukherjee and also by Frey. Applicants respectfully disagree. Claim 17 is directed to **metadata included in each node of a map**, where the map comprises **a node representing a data object, a node representing a file system, a node representing a volume manager, and one or more nodes representing partitions**. Applicants can find no teaching or suggestion of such a map, **where each node of the map includes metadata**, anywhere in Mukherjee, Frey or Banerjee. Claim 17 is therefore also believed to patentably distinguish over the art cited by the Examiner.

Applicants note that the Examiner does not address Applicants' arguments with respect to claim 14. In regard to claim 14, the Examiner asserts that Frey discloses "wherein the method is used to create an image or copy of the first storage environment in the second storage environment", and refers to "Figure 3B, Element No. 22, i.e., objects {A, B and E} in server 36 and the copy or image of the same in server 38" in support of this assertion. Applicants respectfully disagree. Figure 3B does not show a "copy or image" of objects A, B or E. Rather, Figure 3B shows "files A, B, C, D and E **striped across** two server nodes, a first server node 36 and a second server node 38" (col. 4, lines 39 – 41 of Frey). The letters A, B, E, etc. at the different server nodes 36 and 38 refer to different blocks of the files, not to copies or images of the files: see, e.g., col. 4, lines 24 – 26: "Each data storage system 22 (here, a disk) is shown divided into **stored**

file blocks labeled according to the file A, B, C, D or E from which the blocks originated". Furthermore, there is no teaching or suggestion in Frey, Mukherjee or Banerjee of **using the method** recited in claims 9 and 13 (from which claim 14 depends) to create an image or copy of the first storage environment in the second storage environment. Claim 14 is therefore also believed to patentably distinguish over the art cited by the Examiner.

Claim 25 recites a map that is used to "**replicate the second file system within the first file system** in a **first file system format**". In rejecting claim 25, the Examiner asserts that Mukherjee "discloses different data or file formats" and cites column 1, lines 27 – 29 and column 7, lines 63 – 67 of Mukherjee in support. Applicants respectfully disagree. The cited lines of Mukherjee are:

> (Column 1, lines 27 – 29): Increased constraints are placed on the storage and retrieval of multimedia data over traditional textual and numeric data due to inherent differences in the characteristics of the data types.
>
> (Column 7, lines 63 – 67): At step 90 an initial quantity of bandwidth is allocated to each manager. The initial bandwidth allocations are based on criteria such as prior experience, the expected workload, and the type of data the manager controls.

Applicants can find no teaching or suggestion, in these lines or anywhere else in Mukherjee, Frey or Banerjee, of "**using a map** to **replicate a second file system within a first file system** in **a first file system format**", as recited in claim 25. Accordingly, claim 25 is also believed to patentably distinguish over the art cited by the Examiner.

With respect to claim 26, the Examiner asserts that "Banerjee discloses XML data structure and distributing the data structure through the Internet" and refers to "col. 23, lines 1 – 31, i.e., the components defined in the XML associated with the template are added to the customer site file". (As Applicants noted in response to the previous Office Action, Applicants assume the Examiner meant to cite column 22, not column 23, which does not contain the text specifically cited by the Examiner.) Banerjee teaches a wizard used to build web sites using stored web site components: "The web site building wizard appliance stores a large number of such components so that a novice user does not have

to reinvent them. The components can be represented in any manner known in the art. In one embodiment, each component is described by an extensible markup language (XML) document." (Column 21, lines 29 – 35). The "components" taught by Banerjee "handle specific functional needs of an enterprise operating a web site on the Internet." (Column 20, lines 65 – 66). Examples of the components include "a site logo, a site name, a legal notice, terms of use, and a privacy statement" and "a product or service description, a product/service price, a list of products/services, a component for searching for a product/service among the list of products, a hierarchical list of products/services within categories and subcategories, a component for searching products/services falling within a category or subcategory, support contact information, personnel lists, an item to search a personnel list, a map of the web site, links to related web sites, a calendar of appointments/events, a banner advertisement and a shopping cart." (Column 21, lines 3 – 20).

In rejecting claim 26, the Examiner specifically asserts that Banerjee's teaching that the "template are added to the customer site XML file" is a disclosure of "distributing the data structure through the Internet". The Examiner is incorrect in this assertion. Banerjee **does not teach or suggest distributing anything through the Internet in adding to the customer site XML file**: see, e.g., column 22, lines 22 – 32: "According to one embodiment, the wizard represents the customer's web site using an XML file (the "customer site XML file"). When the customer initially selects a template, the components defined in the XML associated with the template are added to the customer site XML file. As the user goes from screen to screen in the wizard, the user specifies changes, deletions or additions to the components in the site. In response to the user input entered through these screens, the wizard changes, deletes or adds XML content in the customer site XML file."

Further, the Examiner asserts that "it would have been obvious to modify both Frey and Mukherjee in view of Banerjee **due to the wide use of the XML language** especially when the Internet is being used as the protocol for the transfer; and also to **increase system performance** by using one very popular language that would minimize

the formatting and re-formatting of data to only one common format". Applicants respectfully disagree. An alleged "wide use of the XML language" does not make using XML to generate a portable representation of a data structure **representing one or more physical locations of a data object within a second storage environment**, and **distributing the portable representation to a third storage environment,** as recited in claim 26, obvious. Neither Banerjee, Mukherjee nor Frey, taken singly or in combination, teach or suggest creating or distributing XML representations of such a data structure. Furthermore, there is no teaching or suggestion of the performance impact of formatting or re-formatting a representation of such a data structure anywhere in Banerjee, Mukherjee or Frey. Accordingly, claim 26 is also believed to patentably distinguish over the art cited by the Examiner.

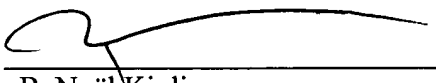
Applicants also respectfully submit that numerous ones of the remaining dependent claims recite further distinctions over the cited art. However, since the independent claims have been shown to be patentably distinct, a further discussion of the remaining dependent claims is not necessary at this time.

CONCLUSION

Applicant submits the application is in condition for allowance, and an early notice to that effect is requested.

If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5760-16700/BNK.

Respectfully submitted,



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